# SUSTAINABLE PLANNING OVERVIEW

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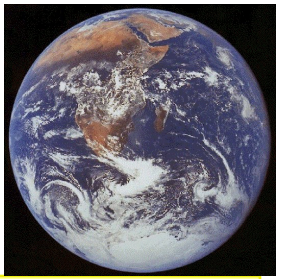
# Agenda

- Define Sustainability
- Overview
- Analysis of Considerations & Constraints
- Applications
- Army Examples
- Resources
- Conclusion
- Final Thoughts: Sustainability Ideals
- Video – “The Next Industrial Revolution”

# Sustainability Defined



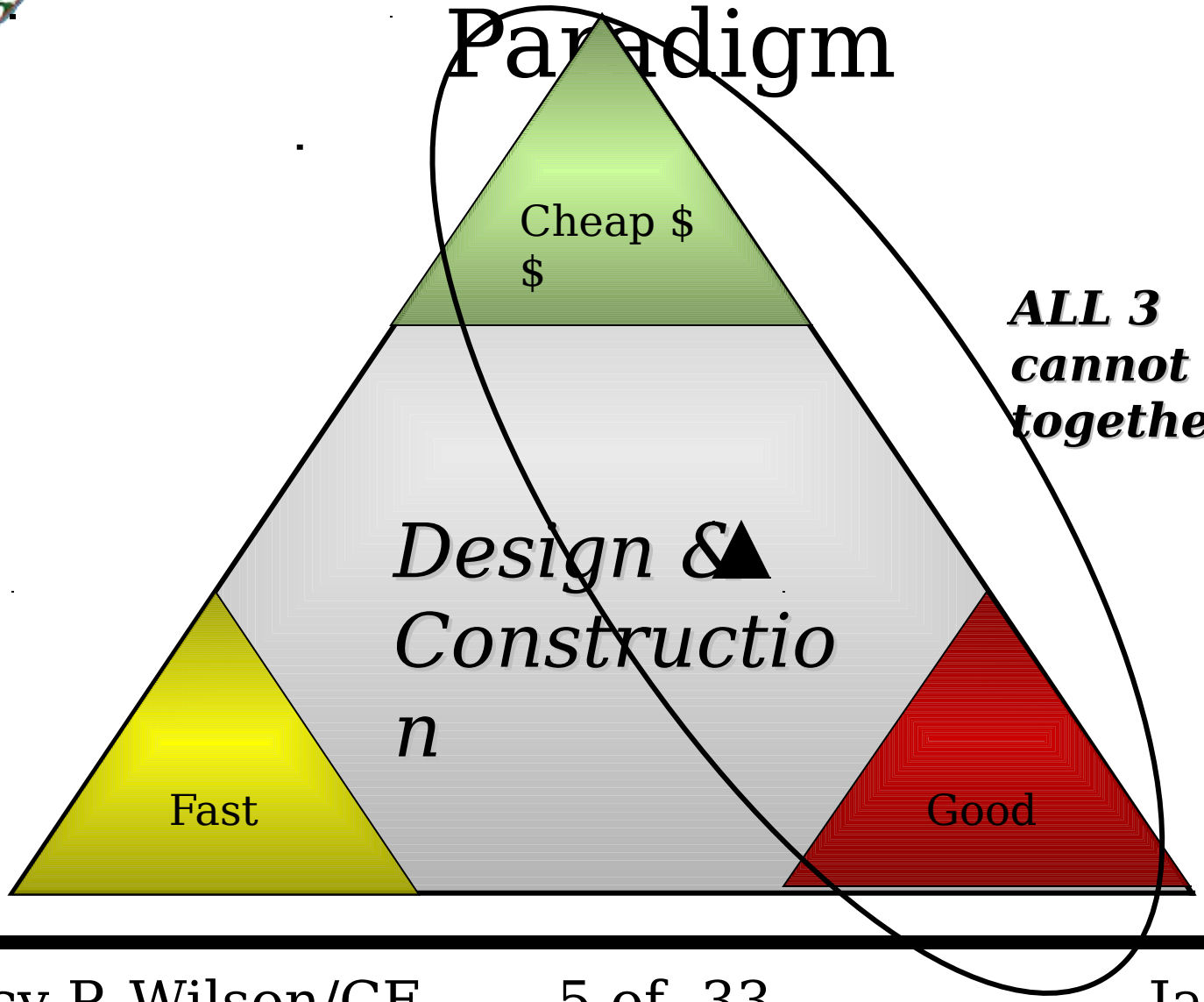
*"Sustainable Design is the design, construction, operation and reuse/removal of the built environment (infrastructure as well as buildings) in an environmentally and energy efficient manner."*

**Simply put** –
Sustainable installations are installations that

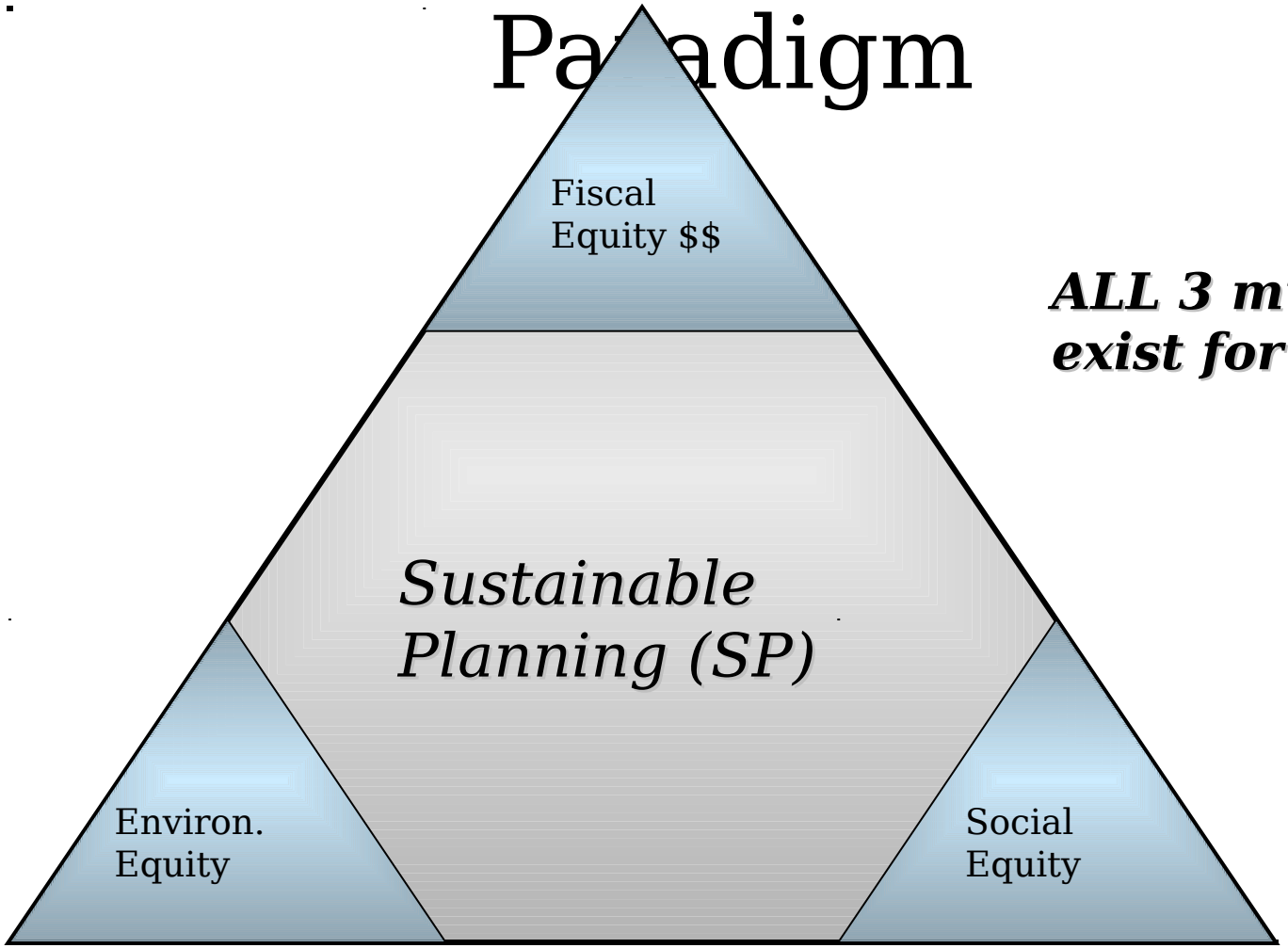
- ✓ *will be there tomorrow*
- ✓ *to meet tomorrow's missions*

# What is Sustainable Development?

# Design/Construction Paradigm

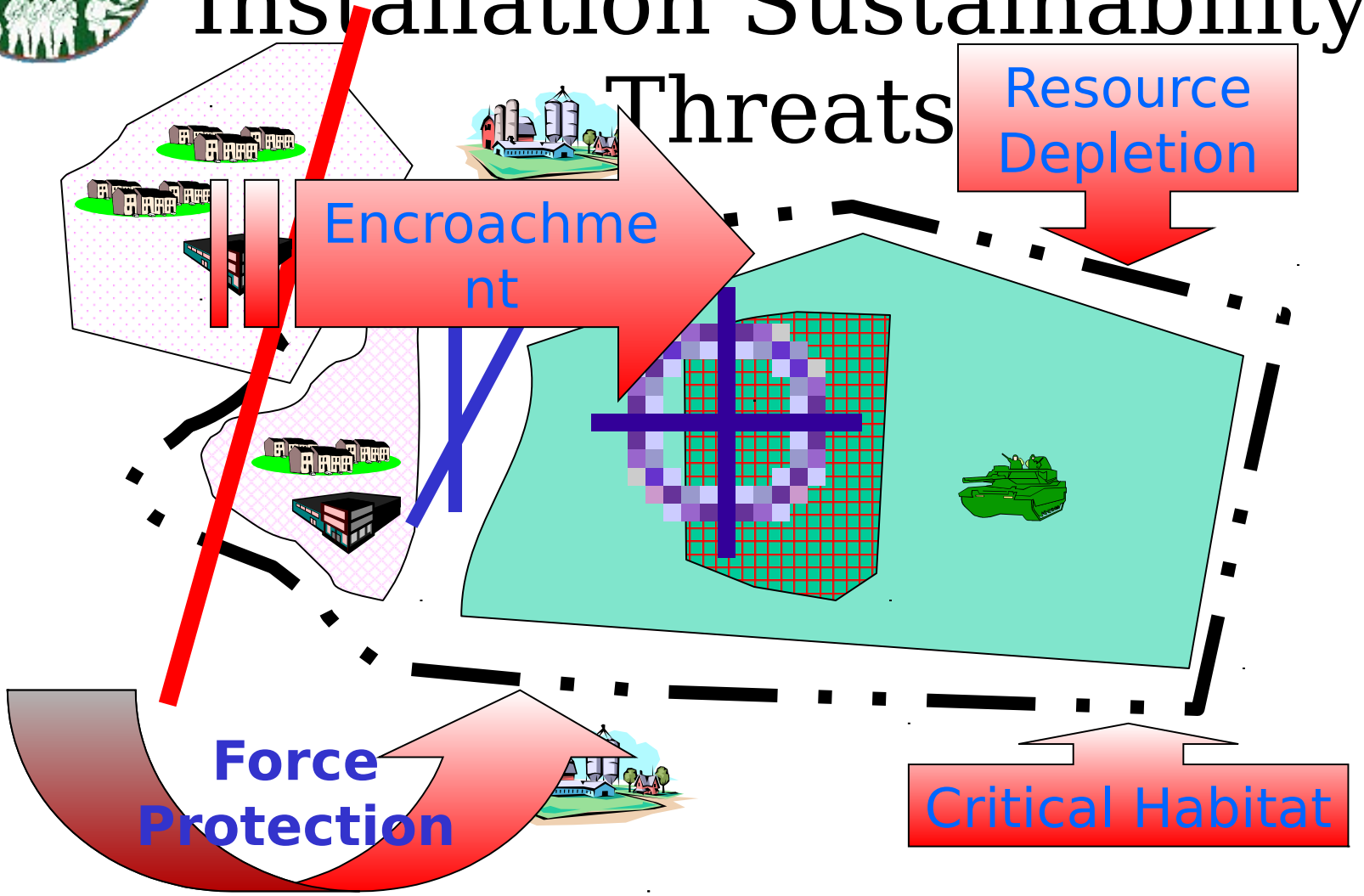


# Sustainability Planning Paradigm




***ALL 3 must exist for SP***

# Installation Sustainability Threats



# Resource Depletion

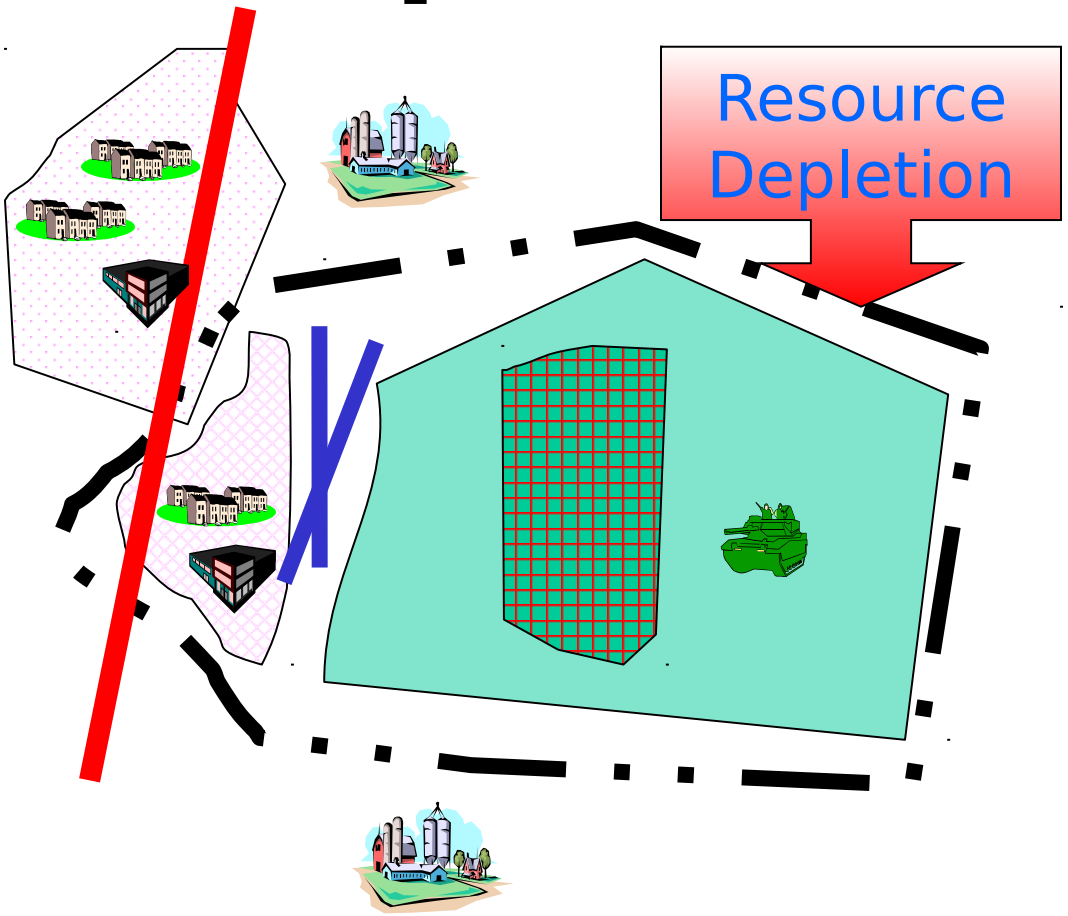
**Land**

**Energy**

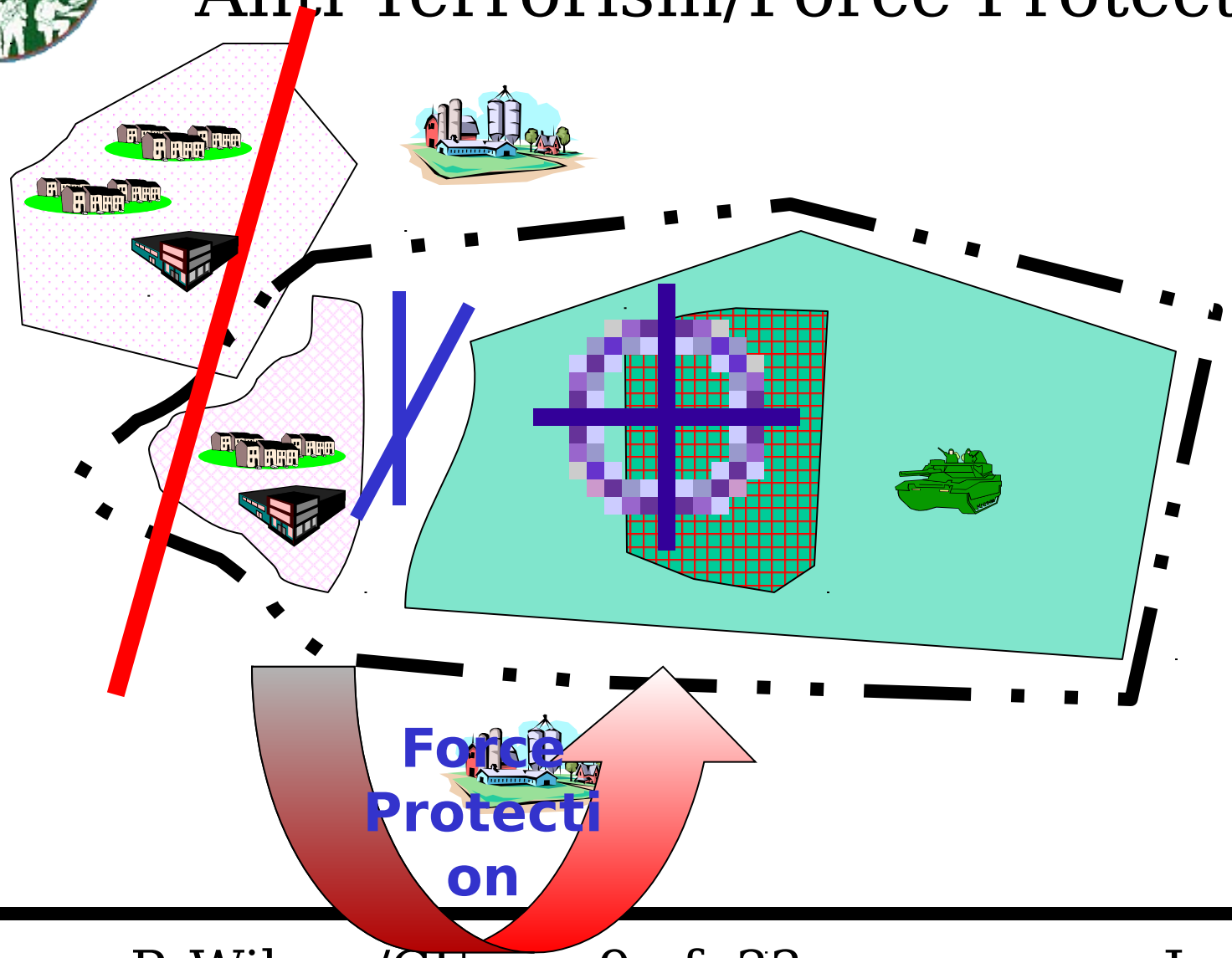
- **Gas**
- **Electric**

**Water**

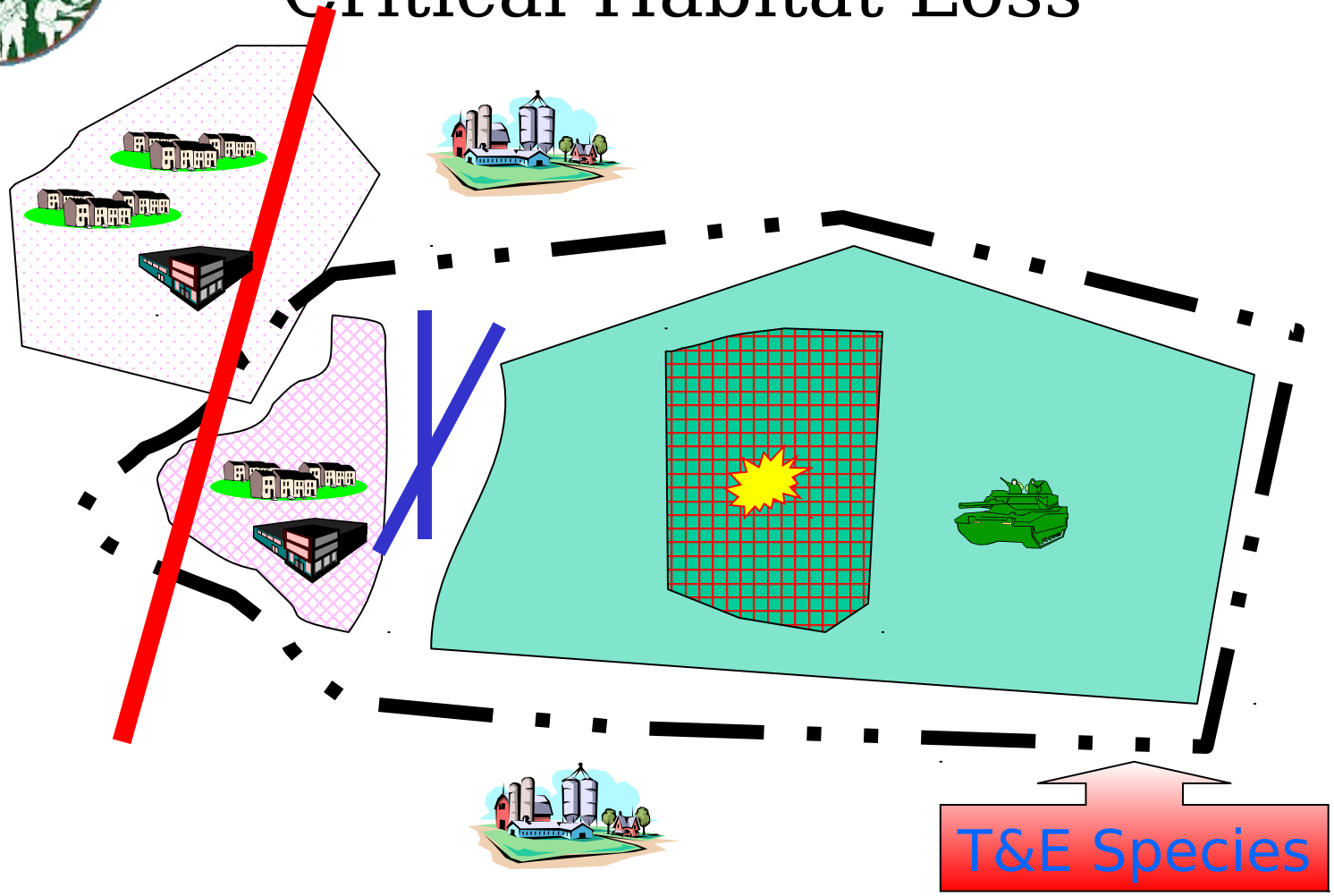
- **Fresh**
- **Waste**
- **Storm**



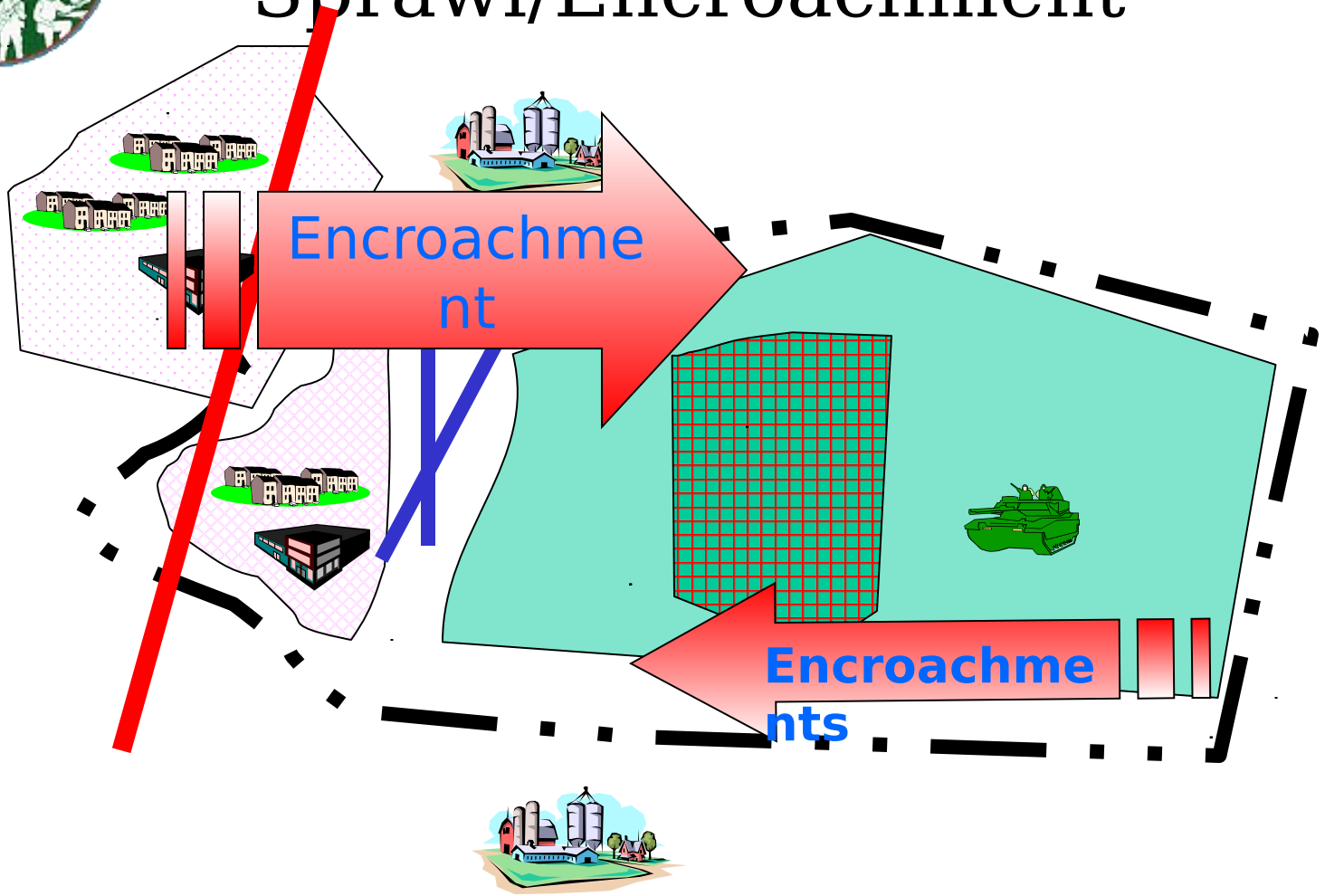
# Anti-Terrorism/Force Protection



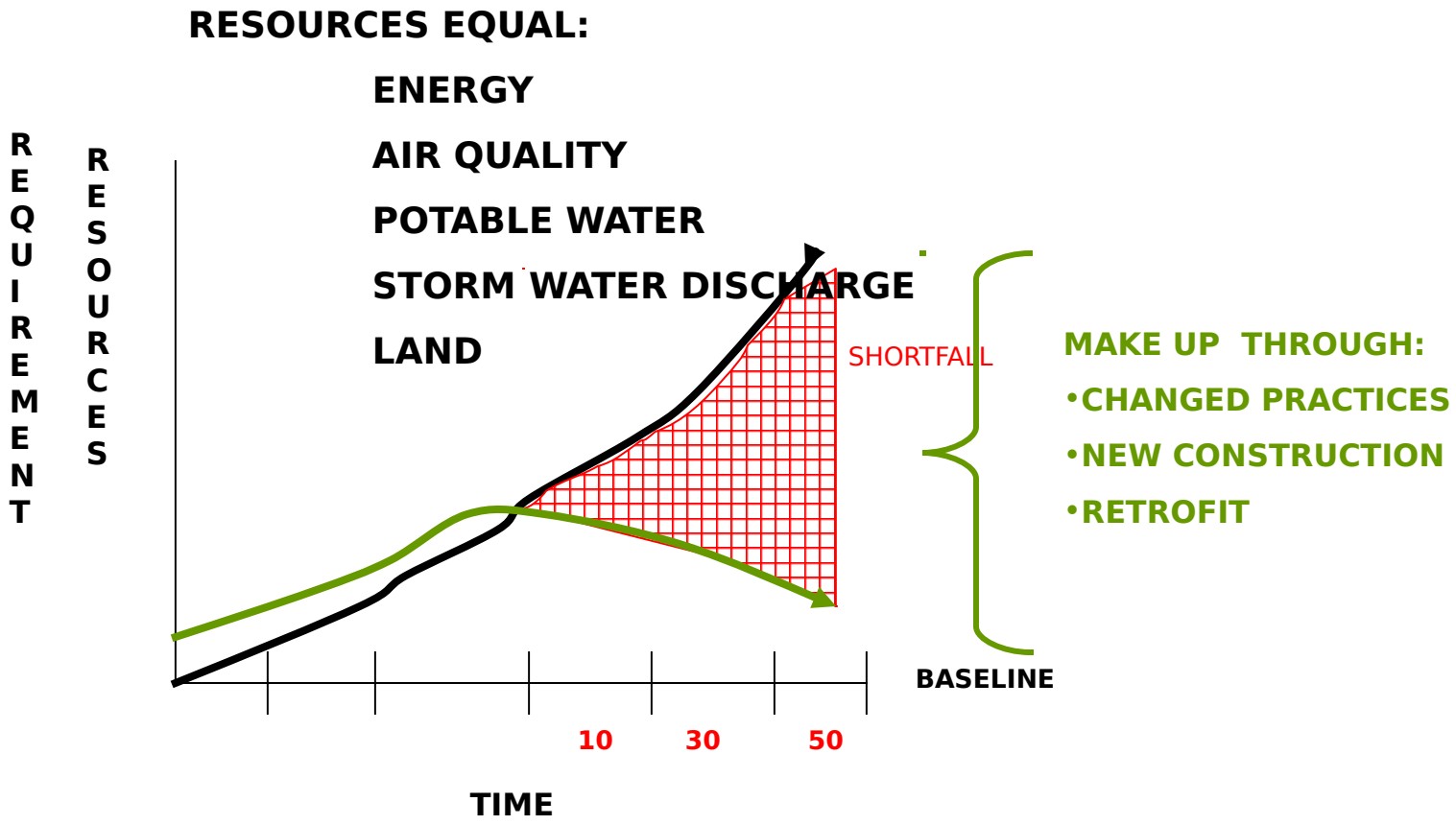
# Critical Habitat Loss



# Sprawl/Encroachment



# Why "Sustainability" is Not an Option



# Another Way of Looking at it -- Three Hurdles to Sustainability

(Fossil Fuel) Energy Dependence

- Global Warming
- Crisis Availability
  - Access
  - Cost

Natural Resource Competition

- Water
- Clean Air

Loss of Usable Space (Training Area)

- Adjacent Land Use Change
- Critical T&E Habitat (Migration)
- Diversion to MILCON, waste

# Strategy for Sustainability

Energy Independence

- Reduced Use
  - Efficient Buildings
  - Efficient transportation (reduce automotive)
- Renewable energy

(Near) Zero Sum Natural Resource Use

Defend Land Development

- Proactive community engagement (JLUS, etc.)
- Shrink cantonment (in-fill development)
- Critical acquisition (development rights)
- Maintain/increase habitat

Reduce Transportation Impacts

# Transportation

Together, infrastructure and transportation account for most of the energy use

- Transportation depends on Infrastructure
- Transportation determines Infrastructure
- Factors
  - Location
  - Network (type, capacity)
  - Siting
  - Power type

# A Special Word about the Automobile

The Auto has become an integral part of the American definition of “quality of life”

The Auto is a major challenge to sustainability

- Energy Use
- Air quality
- Congestion
- Facility Dispersion (loss to parking)
- Storm water management / water table recharge (impervious surface area)
- Congestion
- Loss of natural/training area (sprawl)
- Security (access/weapons)
- Reduced health (obesity)
- Social equity

Getting to sustainability means getting the community out of their cars–willingly

# Examples – Mitigation Strategies

Potable Water
- Irrigation (xeriscape)
- Efficiency
- Greywater

Storm Water
- Retention/reuse (greywater)
- Impervious surface reduction
- Bioremediation
- Landscape change

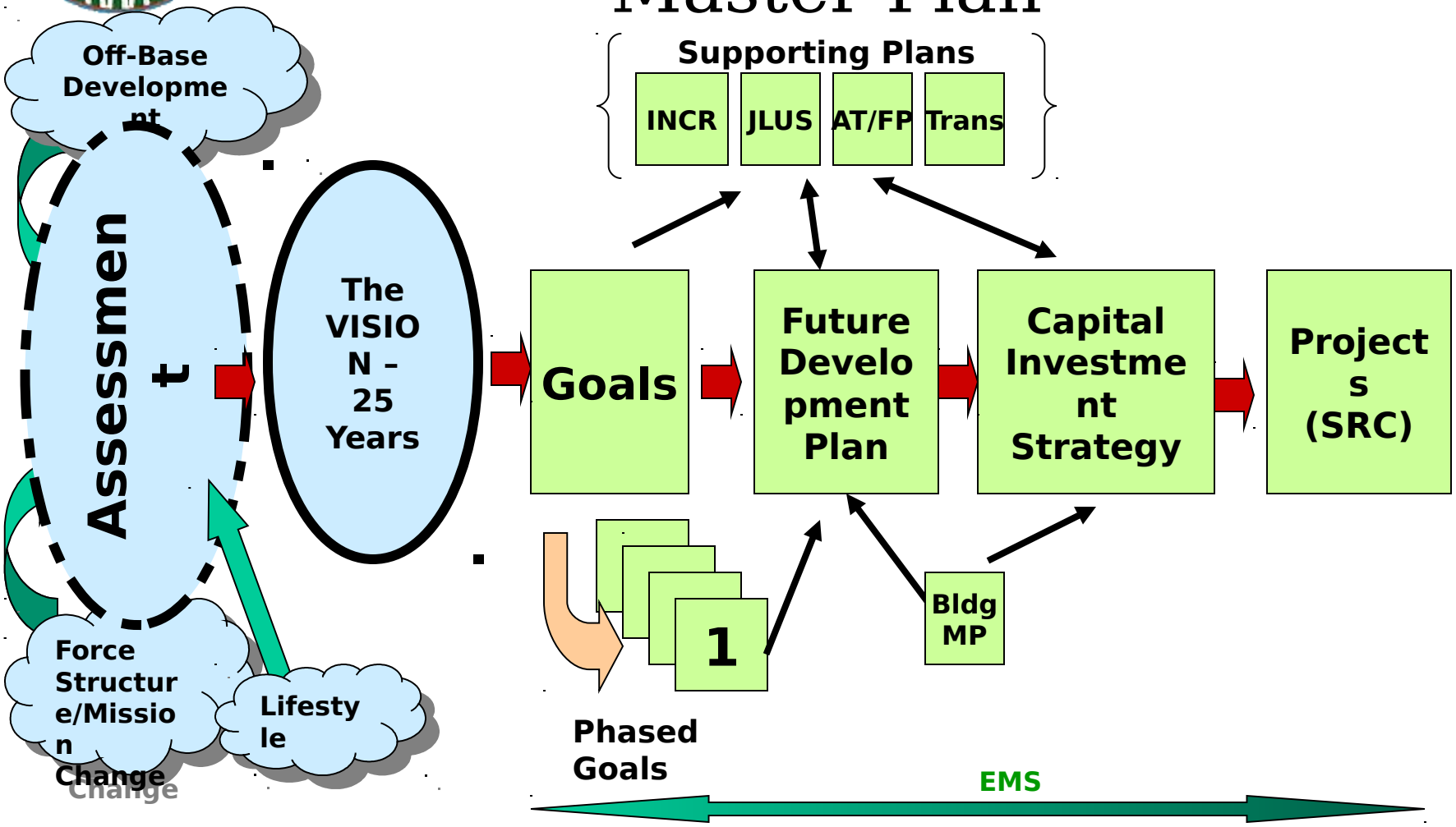
Waste Water
- Efficiency

Building Energy Use
- Efficiency
  - Lighting
  - HVAC
- Source
- Siting

Air Quality
- Vehicle trip reduction
  - Bike/Pedestrian
  - Public Transit
- Fuel change
- Emissions controls

Habitat
- Environmental corridors
- Natural vegetation

# Building the Sustainable Master Plan



# Goal Setting
# Some Pioneer Efforts

Bragg

- Buildings – Platinum
- Water consumption -- 90%
- Solid waste -- net zero
- Energy cost – 80% reduction

Hood

- Energy – net 75% renewable / 50% generated on-post
- Water consumption – reduce by 45%

Carson

- Purchased water consumption – 75% reduction
- Vehicle trips – 40%
- Buildings – Platinum
- Solid waste – net zero

Lewis

- Energy – grid independent
- Solid waste – net zero
- Waste water – zero discharge

# Army Sustainability Examples

# Army Examples – Ft. Lewis

**Building 2019 Fort Lewis, WA**

**Project Team:** **Public Works Director – Colonel Perrenot**

**SPiRiT/LEED Rating Projections:**

Pre-Design – LEED (*7* Points)

LEED Registered

Target LEED Silver (38 Points)

**Building Statistics:**

*OMA* FY *02*, Project Number *??*

*Design Bid Build*

**Renovation Completed FY 02, LEED EB Baseline Study, End of 04**

Cost *$??* (PA) *$??Mil* (CWE)

Facility Area 9.50 acres

Facility Footprint 50, 570 Square Ft

100 Person Occupancy

*Masonry Bearing Wall with Steel Roof Framing, and Clay Tile Roof*

*??*% Energy Use Reduction

*$??* Project Life cycle cost Savings

**Life Cycle Synergy**
**Facility Delivery Process**
Pre-Design Meeting
Functional Analysis Concept Development (FACD) Charrette
**Current Mission**
Quality of Life Improvements
Operation & Maintenance Considered
**Future Missions**
Longevity of Materials & Systems Considered
Increased Usage Flexibility

**Green Results**

**Sustainable Sites**
Erosion & Sediment Control Plan
Environmentally Preferable Transportation
Stormwater Management
Light Pollution Reduction
Green Site & Building Exterior Management

**Water Efficiency**
Water Efficient Fixtures
Water Efficient Landscaping

**Energy and Atmosphere**
Optimizing Energy Performance
Continuous Commissioning & Maintenance
Green Power

**Materials and Resources**
Local Materials
Construction Waste Management
Recycled Materials
Rapidly Renewable Materials
Certified Wood

**Indoor Environmental Quality (IEQ)**
Green Housekeeping
Construction IAQ Management
Low /Zero VOC Carpets, Paints, Sealants
Individual Room HVAC Control
Daylighting & Views

# Army Examples – Ft. Hood

**Ft. Hood Environmental Training Facility**

**SPiRiT/LEED Rating Projections:**

**Pre-Design – SPiRiT Platinum (?? Points)**

**Final Design – SPiRiT Platinum (?? Points)**

**Target LEED Platinum (?? Points)**

**Building Statistics:**

**Program ?? , FY ??, Project Number ??**

**?? Design Bid Build /Design Build**

**?? Projected Completion Date**

**Cost ?? (PA/CWE)**

**Facility Area ?? GSF**

**Facility Footprint ?? GSF**

**?? Person Occupancy**

**Construction Type (Ex., Cast Concrete, Steel Roof Framing, Standing Seam Metal Roof)**

**??% Energy Use Reduction**

**??$ Estimated Life-cycle cost savings**

**Environmental Training Facility Ft. Hood Texas**

**Life Cycle Synergy**

**Facility Delivery Process**
Charrette used to identify goals

**Current Mission**
Surfaces, furnishings and equipment selected using life cycle cost analysis
Highly functional, healthy, productive work environment

**Future Missions**
Straw panel interior operable wall system
Conference room suitable for installation wide use

**Green Results**

**Sustainable Sites**
Sited on previously developed land
Permeable parking surfaces for water quality / runoff control and heat island reduction

**Water Efficiency**
Waterless urinals / low flow toilets
Rainwater collection systems
Drip Irrigation
Xeriscape landscaping / drought tolerant landscaping

**Energy and Atmosphere**
Straw bale construction / superior building envelope
High efficiency HVAC unit
Solar powered parking / site lighting
Light pipes and/or active (tracking) daylighting fixtures
Energy efficient windows
On-demand hot-water
Interior lighting occupancy sensor controlled

**Materials and Resources**
Rapidly renewable materials include straw bale exterior and straw panel interior walls
Recycled bowling alley floor / salvaged materials
Recycled Glass in Stucco

**Indoor Environmental Quality (IEQ)**
Low VOC paints / non-solvent-based adhesives
Pre-occupancy mech. and elect. systems commissioning

# Army Examples – Ft. Carson

**Ft. Carson Training Facility**

**Project Team:**

- **Design Agent - Omaha District, U.S. Army Corps of Engineers**
- **Public Works Director - Col Hal Alguire**
- **Project Managers - Linda White, Omaha & Scott Clark, Ft. Carson DECAM**
- **Master Planner - Bill Davis**
- **AE - Wilson and Company**
- **Consultant - HDR, Pacific Northwest National Labs (PNNL)**
- **Construction Contractor – Torres/Bryant JV – Alliance Sub**

**SPiRiT/LEED Rating Projections:**

Pre-Design – SPiRiT Bronze (28 Points)

Final – SPiRiT Silver (48 Points)

**Building Statistics:**

Ft. Carson DECAM Sustainable Facilities Demonstration, Funded by FORSCOM P2 Dollars, FY01, UMMCA

**Design Bid Build**

November 2002 Completion Date

Cost $560,000

Facility Area 2,800 GSF

Facility Footprint 3,100 SF

70 Person Occupancy

Cast Concrete, Steel Roof Framing, Standing Seam Metal Roof

25% Energy Use Reduction

Life-cycle Cost Savings Undetermined_

**Training Facility**
**Ft. Carson Colorado**

## Life Cycle Synergy

## Facility Delivery Process
'Green Team' / goal setting charrette

## Current Mission
Appropriate product selection
Attention to daylighting / improved IEQ / high quality, functional, healthy interior environment

## Future Missions
Planned life and future uses

## Green Results

### Sustainable Sites
Located 2 miles from natural gas fueling station
Limited site disturbance and maximized the use of free site energy

### Water Efficiency
Low flow toilets and electronic metered water faucets
No outdoor watering system, xeriscape plan

### Energy and Atmosphere
Building orientation / low emissivity insulating windows
Natural lighting / reduced cooling/heating requirement
Electric instantaneous water heaters under sinks
Natural cooling cupola, no AC
High efficiency natural gas furnace and good insulation
Windows and furnace Energy Star compliant
Programmable thermostats
Photovoltaic exterior light and lighting motion sensors

### Materials and Resources
Materials Reuse from demolition projects
Use of recycled content toilet partitions, insulation, steel, ceiling tiles, parking stops, asphalt, and concrete
structure and concrete were locally manufactured

### Indoor Environmental Quality (IEQ)
Use of zero VOC paint
Sub slab vent system for radon collection and release

# Building Master Plans

VISION !!!!

Plan for Upgrade or Replacement

- Identify major changes necessary to increase sustainability and time period
- Incorporate into CIS

Assess Building

- SPiRiT Evaluation
- Future mission
- Location

Develop Community/Urban Design Frameworks to ensure implementation of VISION

# Metric Development

- Devens, MA (AICP Casebook)
- LEED Multi-Building
- IDG Guidance
- AF Sustainability Guide
- GSA Real Property Sustainable Development Guide

# Conclusion

Finally –

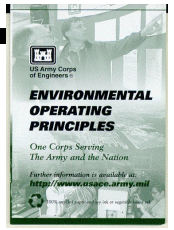
Sustainability is a mind-set, a way of thinking about problems and opportunities, and a commitment to the future._

- Hannover Principles
- McDonough speech
- Environmental Operating Principles

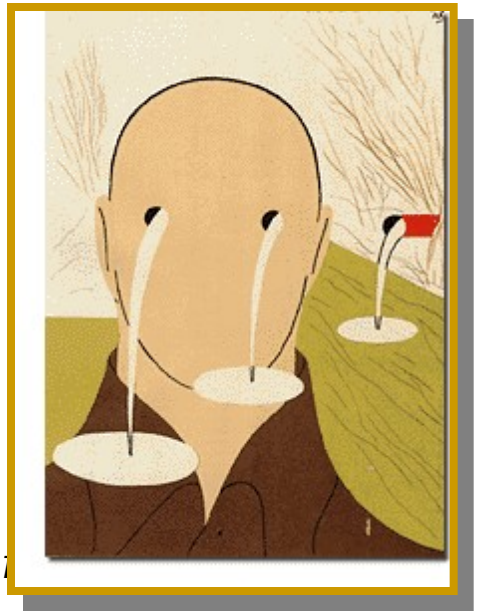
# Hannover Principles: Design for Sustainability William McDonough, FAIA

. 1. **Insist on rights of humanity and nature to co-exist** in a healthy, supportive, diverse and sustainable condition.
2. **Recognize interdependence**. The elements of human design interact with and depend upon the natural world, with broad and diverse implications at every scale. Expand design considerations to recognizing even distant effects.
3. **Respect relationships between spirit and matter**. Consider all aspects of human settlement including community, dwelling, industry and trade in terms of existing and evolving connections between spiritual and material consciousness.
4. **Accept responsibility for the consequences of design decisions** upon human well-being, the viability of natural systems and their right to coexist
5. **Create safe objects of long-term value**. Do not burden future generations with requirements for maintenance or vigilant administration of potential danger due to the careless creation of products, processes or standards.
6. **Eliminate the concept of waste**. Evaluate and optimize the full life-cycle of products and processes, to approach the state of natural systems, in which there is no waste.
7. **Rely on natural energy flows**. Human designs should, like the living world, derive their creative forces from perpetual solar income. Incorporate this energy efficiently and safely for responsible use.
8. **Understand the limitations of design**. No human creation lasts forever and design does not solve all problems. Those who create and plan should practice humility in the face of nature. Treat nature as a model and mentor, not as an inconvenience to be evaded or controlled.
9. **Seek constant improvement by the sharing of knowledge**. Encourage direct and open communication between colleagues, patrons, manufacturers and users to link long term sustainable considerations with ethical responsibility, and re-establish the integral relationship between natural processes and human activity."

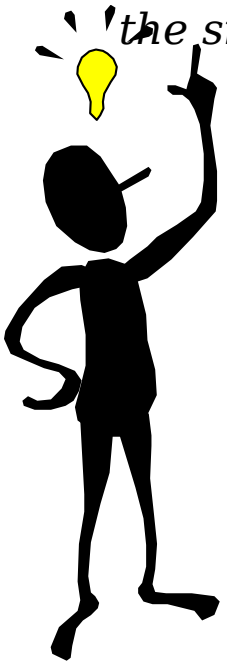
# Environmental Operating Principles


US Army Corps of Engineers
ENVIRONMENTAL OPERATING PRINCIPLES
One Corps Serving The Army and the Nation
Further information is available at: http://www.usace.army.mil

- **Strive to achieve environmental sustainability**. An environment maintained in a healthy, diverse and sustainable condition is necessary to support life.
- **Recognize the interdependence of life and the physical environment**. Proactively consider environmental consequences of Corps programs and act accordingly in all appropriate circumstances.
- **Seek balance and synergy among human development activities and natural systems** by designing economic and environmental solutions that support and reinforce one another.
- Continue to accept corporate responsibility and accountability under the law for activities and decisions under our control that impact human health and welfare and the continued viability of natural systems.
- **Seeks ways and means to assess and mitigate cumulative impacts to the environment**; bring systems approaches to the full life cycle of our processes and work.
- **Build and share an integrated scientific, economic, and social knowledge base** that supports a greater understanding of the environment and impacts of our work.
- **Respect the views of individuals and groups interested in Corps activities**, listen to them actively, and learn from their perspective in the search to find innovative win-win solutions to the nation's problems that also protect and enhance the environment.



***Albert Einstein wrote**, "The world will not evolve past its current state of crisis by using the same thinking that created the situation."*



*"It involves the design of things that celebrate interdependence with other living systems. Fro an industrial-design perspective, it means products that work within cradle-to-cradle life cycles rather than cradle-to-grave ones."*
**William McDonough**

*"It is time for plans [designs] that are creative, abundant, prosperous, and intelligent from the start."*
**William McDonough Revised by a Visionary Planner**

# *Sustainability Video*